

Leading by Example Council Meeting

November 14, 2017

Agenda

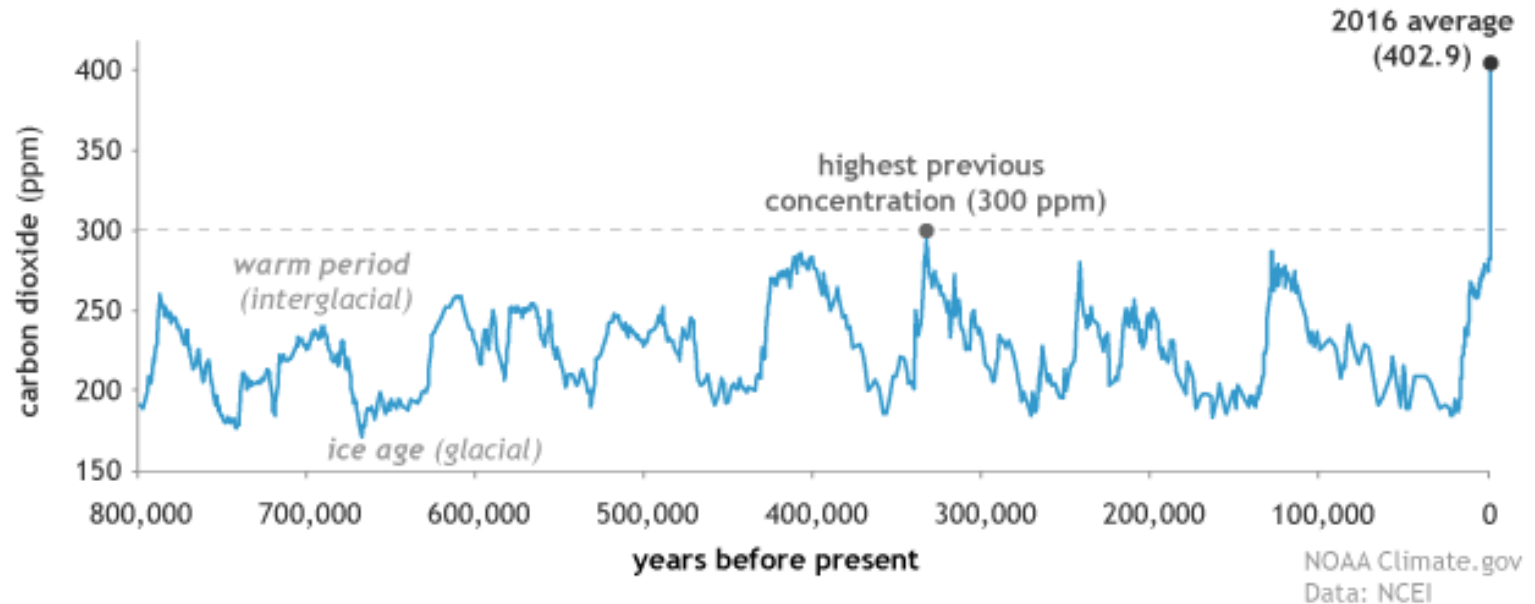


- Welcome & Introductions
- General & Commonwealth Updates
- LBE Updates
- Meeting Focus Topic: Alternative Fuel Vehicles and Infrastructure
- *Tour of 888 Boylston*

General and Commonwealth Updates

New Global Carbon Dioxide Data

CO₂ during ice ages and warm periods for the past 800,000 years



New Report from National Oceanic and Atmospheric Administration (NOAA)

- The global average concentration of carbon dioxide hit a new record high in 2016: 402.9 ppm
- The increase from 2015 to 2016 was roughly 3.5 ppm—largest one-year increase in the modern record
- If global energy demand continues to grow and to be met mostly with fossil fuels, atmospheric carbon dioxide will likely exceed 900 ppm by the end of century

[NOAA, 2017](#)

Block Island Wind Farm

- Block Island (Rhode Island) offshore wind farm went online in May
- Five wind turbines replaced island's electrical generation off from diesel generators, three miles off coast
- First offshore wind farm in US

[Rhode Island Press Release](#)

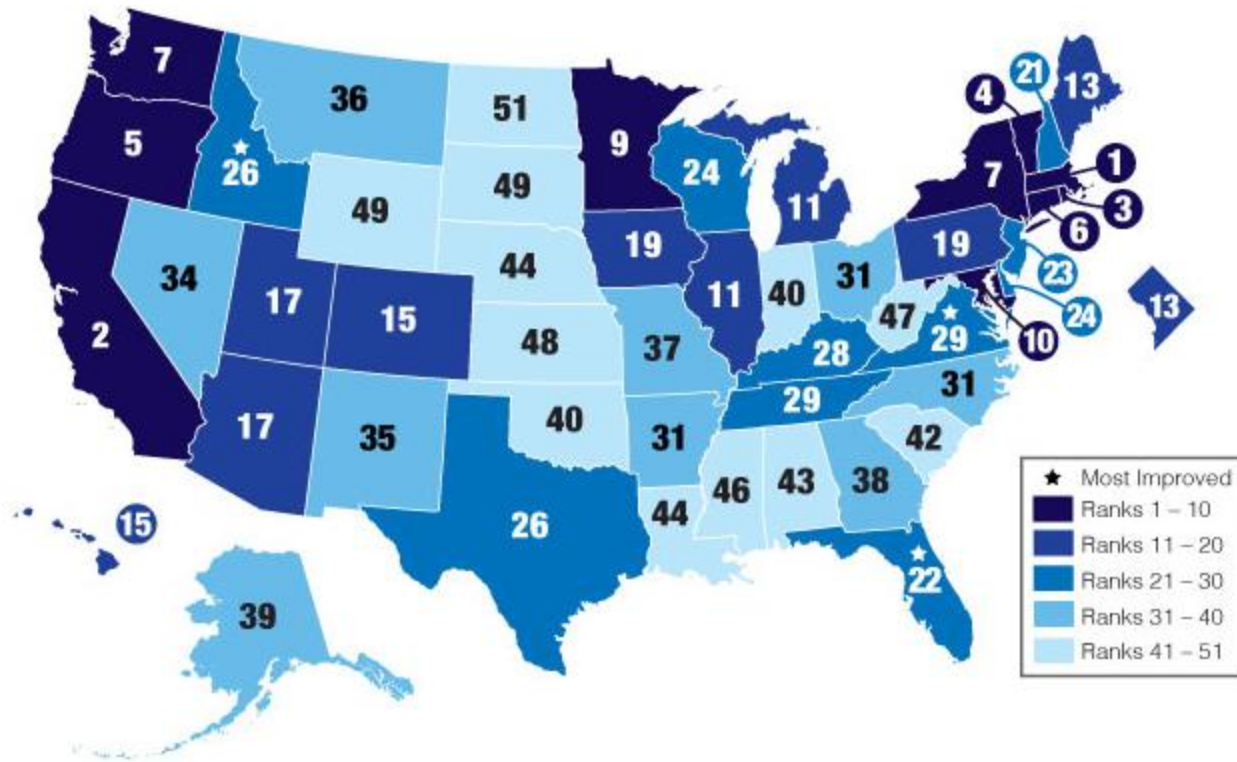
[Photo: NOAA](#)



MA Energy Efficiency Ranking - #1!

American Council for an Energy Efficient Economy Scorecard

- MA ranked #1 for seventh straight year



[ACEEE Scorecard, 2017](#)

[Commonwealth Press Release](#)

LED Streetlight Conversion Program for Municipalities

- Over \$4.3 Million in Grants to 40 Municipalities awarded in September
- DOER has partnered the with Metropolitan Area Planning Council (MAPC), MA Municipal Wholesale Electric Company (MMWEC), Energy New England (ENE), and four Municipal Light Plant (MLP) communities
- Streetlights are procured in bulk reducing the up-front cost of conversion

<u>Municipality</u>	<u>Grant</u>	<u>Municipality</u>	<u>Grant</u>
<u>Amesbury</u>	\$84,071	<u>Manchester</u>	\$16,065
<u>Andover</u>	\$84,339	<u>Medfield</u>	\$20,899
<u>Ayer</u>	\$36,859	<u>Medford</u>	\$334,788
<u>Beverly</u>	\$241,891	<u>Millis</u>	\$22,770
<u>Brockton</u>	\$282,837	<u>Newburyport</u>	\$114,821
<u>Burlington</u>	\$115,248	<u>North Andover</u>	\$87,029
<u>Clinton</u>	\$60,962	<u>Northbridge</u>	\$85,068
<u>Cohasset</u>	\$33,778	<u>Pittsfield</u>	\$260,227
<u>Dracut</u>	\$103,142	<u>Quincy</u>	\$351,423
<u>Erving</u>	\$11,667	<u>Rockland</u>	\$48,641
<u>Foxborough</u>	\$48,249	<u>Sunderland</u>	\$4,060
<u>Franklin</u>	\$112,971	<u>Tyngsborough</u>	\$30,488
<u>Gardner</u>	\$105,905	<u>Ware</u>	\$55,663
<u>Hanover</u>	\$34,481	<u>Warren</u>	\$8,431
<u>Haverhill</u>	\$273,691	<u>Wayland</u>	\$43,093
<u>Holbrook</u>	\$67,257	<u>Webster</u>	\$113,951
<u>Hopkinton</u>	\$25,865	<u>Westport</u>	\$18,585
<u>Leominster</u>	\$190,656	<u>Weymouth</u>	\$249,382
<u>Lowell</u>	\$323,325	<u>Williamsburg</u>	\$9,738
<u>Malden</u>	\$201,320	<u>Winchendon</u>	\$34,896

New Thoreau Exhibits at Walden Pond

- *Walden Pond State Reservation Visitor Center: zero net energy design*
- New exhibits commemorating life and legacy Henry David Thoreau including:
 - A timeline of Thoreau's stay with select quotes from his seminal work, *Walden, or Life in the Woods*
 - A sustainability kiosk highlighting the Visitor Center's sustainable features and performance



[DCR Walden Pond Website](http://www.dcr.waldenpond.org)
Concord, MA

Alternative Portfolio Standard (APS) Regulations Filed

- DOER filed amended draft regulation in October with Joint Committee on Telecommunications, Utilities and Energy
- Projected launch January 2018
- Technologies include:
 - renewable thermal (solar thermal, biomass, heat pumps)
 - fuel cells
 - waste-to-energy thermal
- Public projects eligible if:
 - Systems commercially operating after 1/1/2015
 - received grants/incentives from any state agency prior to the end of 2017 that equals less than 80% of the total project cost (CEC and utility funds are not counted)
- Small, medium and large projects
 - Varying levels of metering required
 - Small projects get pre-minted funds based on 10 years

Solar Massachusetts Renewable Target (SMART) Program Update

- Final regulation published in state register on in August
- September: electric distribution companies filed a Joint Petition for Approval of model w/DPU to implement *An Act Relative to Solar Energy*
 - Proposed Program Start Date: June 1st, 2018
- Initial Competitive Base Price Procurement:
 - Delayed by a few weeks (originally Oct. 24)
 - Expected to clear in mid-January, in line with decision on solar tariff
 - ITC recommending tariff on imported solar panels
 - President has 2 months to act (mid-January)

[DOER SMART Program Website](#)

LBE Updates

FY17 LBE Tracking Form

Thank you to everyone who has submitted their FY17
Tracking Form!

SALEM STATE UNIVERSITY
MASS COLLEGE OF LIBERAL ARTS
UMASS LOWELL
UMASS MEDICAL
BRISTOL COMMUNITY COLLEGE

Due date is...tomorrow!

November, 15th

Please reach out with any questions or delays
regarding your submissions.

LBE Fleet Efficiency Grant Program Awards

- Three agencies awarded **\$252,770** for after-market hybrid upfits:



- DOER **saved over \$50,000** off the MSRP through the negotiated XL Hybrids discounts
 - Savings utilized for additional conversions or reinvested into the grant program
- Conversions expected to increase fuel efficiency by up to 25%
- DCR & Env. Police also installed 27 hybrid upfits

Energy Resiliency Feasibility Study Update

Evaluation of 12 state-owned 24/7 medical care facilities for opportunities to use clean energy technologies to increase the site's energy resiliency

Department of Veteran's Affairs	1. Holyoke Soldiers' Home
Department of Mental Health	2. Corrigan Mental Health Center
	3. Danvers Cottages (10, 2 & 3)
	4. Quincy Mental Health Center
	5. Harry C Solomon Mental Health Center
	6. Taunton State Hospital
Department of Developmental Services	7. Hogan Regional Center
	8. Wrentham Development Center
Department of Public Health	9. Tewksbury Hospital
	10. Western Massachusetts Hospital
Department of Youth Services	11. Stephen French Multiservice Center
	12. Northeast Regional Youth Services Center

- Arup has completed site visits and collected data for all 12 sites
 - Task 1 draft report expected November 17th
 - Existing conditions assessment and identification of energy resiliency gaps
 - Final report expected February 2018

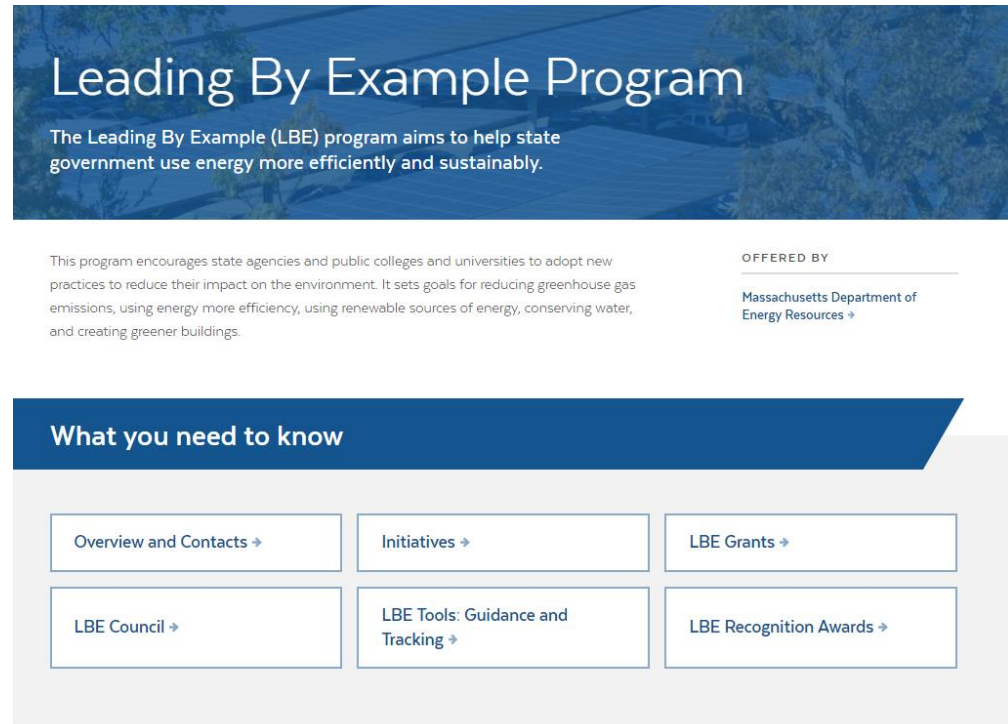
Feasibility Grants

	Program Summary
Description	<p>The 2017 LBE Clean Energy Grant Program – Feasibility Studies (Program) for state entities seeks to support state agency and campus efforts to identify and study a range of potential clean energy technologies that could be deployed at state facilities, resulting in reduced energy use, lower GHG emissions and/or lower energy costs.</p> <p>Eligible technologies to study may include, but are not limited to, renewable thermal (biomass, solar thermal, air and ground source heat pumps, combined heat and power), solar PV canopies, innovative solar PV, energy resiliency, energy storage, and anaerobic digestion.</p>
Contact	Trey Gowdy, Trey.Gowdy@state.ma.us , 617-626-7328

- Received 5 applications totaling \$188,800 to-date
- Applications under review
- See [LBE Website \(PONs Summary\)](#) for more information on program

LBE Website

- New LBE website
- More updates and additions coming soon
 - Currently refreshing State Government Progress and Initiatives pages – stay tuned



LBE Awards Ceremony

- Nov. 30, 10-11:30am
- State House, Great Hall
- Award Categories:
 - State agency/authority
 - Public higher education
 - Municipalities
 - Individual awards (state and municipal)

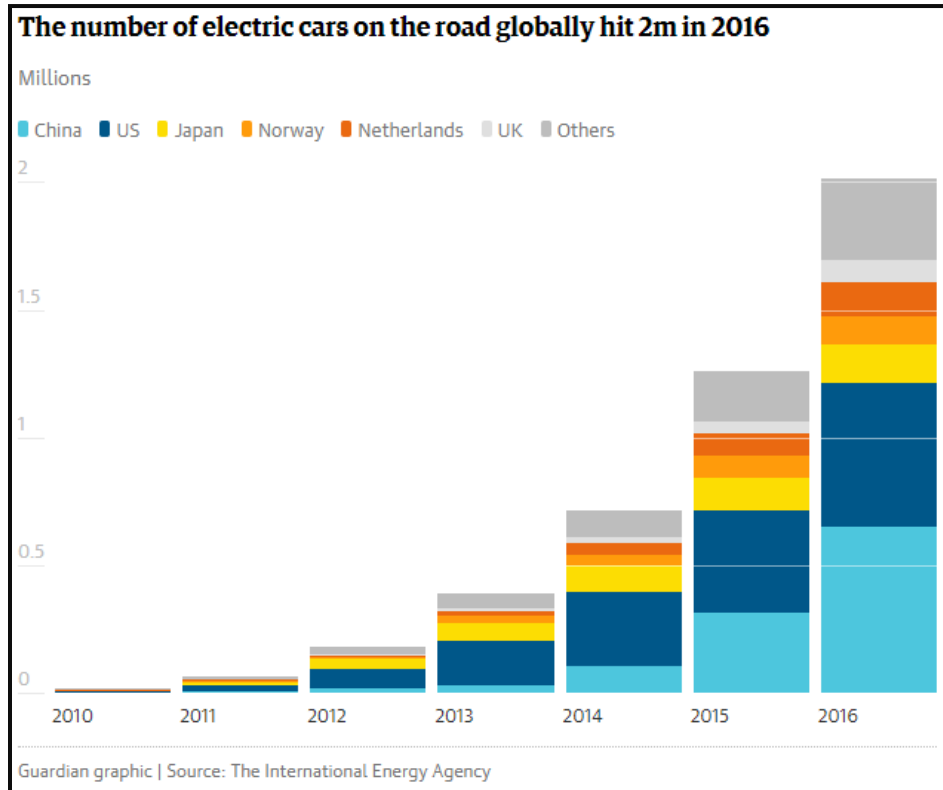


Meeting Focus Topic: Alternative Fuel Vehicles and Infrastructure

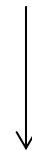
Electric Vehicle Vision from Governments and Manufacturers

EV Snapshot: Where Are We Now?

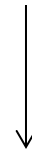
Electric Vehicles (EVs) are experiencing a “rapid market evolution” according to International Energy Agency (IEA)



2005: hundreds



2015: 1 million



2016: 2 million

Scale achieved is small

- EVs are only 0.2% of global market
- 10 countries make up 95% of EV market

EV Market Trends

- EVs Still Growing Rapidly
 - 2016 was record year for EV sales (>750,000)
 - But, growth slowed compared to 2015 (60% v. 77%)
- China is Leading
 - China surpassed U.S. as country w/most EVs (1/3 of total)
 - China is now the largest EV market
 - More than 40% of EVs sold in world were sold in China (twice as many as were sold in U.S).

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Canada							0.52	2.54	5.66	10.73	17.69	29.27
China					0.48	1.91	6.98	16.88	32.22	105.39	312.77	648.77
France	0.01	0.01	0.01	0.01	0.12	0.30	3.03	9.29	18.91	31.54	54.49	84.00
Germany	0.02	0.02	0.02	0.09	0.10	0.25	1.89	5.26	12.19	24.93	48.12	72.73
India				0.37	0.53	0.88	1.33	2.76	2.95	3.35	4.35	4.80
Japan					1.08	3.52	16.14	40.58	69.46	101.74	126.40	151.25
Korea						0.06	0.34	0.85	1.45	2.76	5.95	11.21
Netherlands				0.01	0.15	0.27	1.14	6.26	28.67	43.76	87.53	112.01
Norway			0.01	0.26	0.40	3.35	5.38	9.89	20.37	44.21	84.18	133.26
Sweden							0.18	1.11	2.66	7.32	15.91	29.33
United Kingdom	0.22	0.55	1.00	1.22	1.40	1.68	2.89	5.59	9.34	24.08	48.51	86.42
United States	1.12	1.12	1.12	2.58	2.58	3.77	21.50	74.74	171.44	290.22	404.09	563.71
Others					0.64	0.83	3.25	6.90	12.76	25.35	52.63	87.48
Total	1.37	1.69	2.15	4.54	7.47	16.81	64.58	182.64	388.07	715.39	1 262.61	2 014.22

← #1

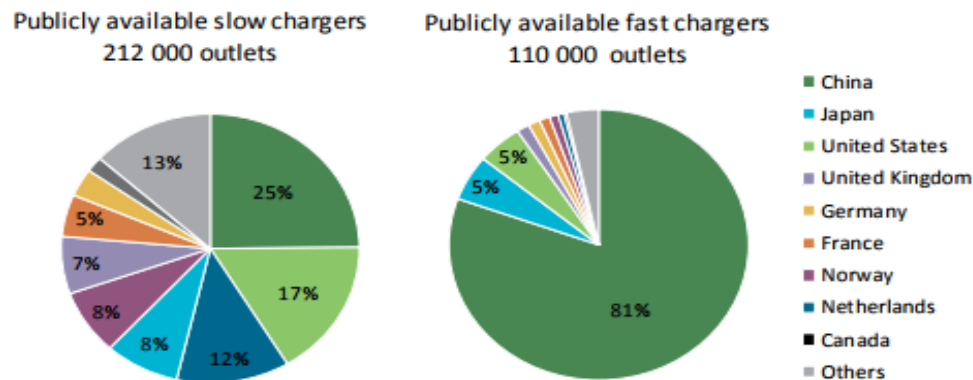
← #2

Major OEMs Commit to an Electric Future

OEM	EV Sales Announcement	EV Offerings Announcement
BMW	<ul style="list-style-type: none"> 0.1 million EV sales in 2017 15-25% of BMW Group's sales by 2025 	
Chevrolet (GM)	30,000 annual EV sales by 2017	<ul style="list-style-type: none"> Two new EVs in next 18 months Add at least 20 new EVs by 2023 <ul style="list-style-type: none"> 10 EVs in China by 2020
Chinese OEMs	4.52 million annual EV sales by 2020	
Daimler	0.1 million annual EV sales by 2020	10 new EVs by 2020
Ford		13 new EVs by 2020
Honda	2/3 of 2030 sales to be EVs (incl. HEVs, FCEVs)	
Renault-Nissan	1.5 million cumulative EV sales by 2020	
Tesla	<ul style="list-style-type: none"> 0.5 million annual EV sales by 2018 1 million annual EV sales by 2020 	
Volkswagon	2-3 million annual EV sales by 2025	At least 30 EV models by 2025
Volvo	1 million cumulative EV sales by 2025	Beginning in 2019, all new models will be hybrid or all-electric

What is Driving this Shift?

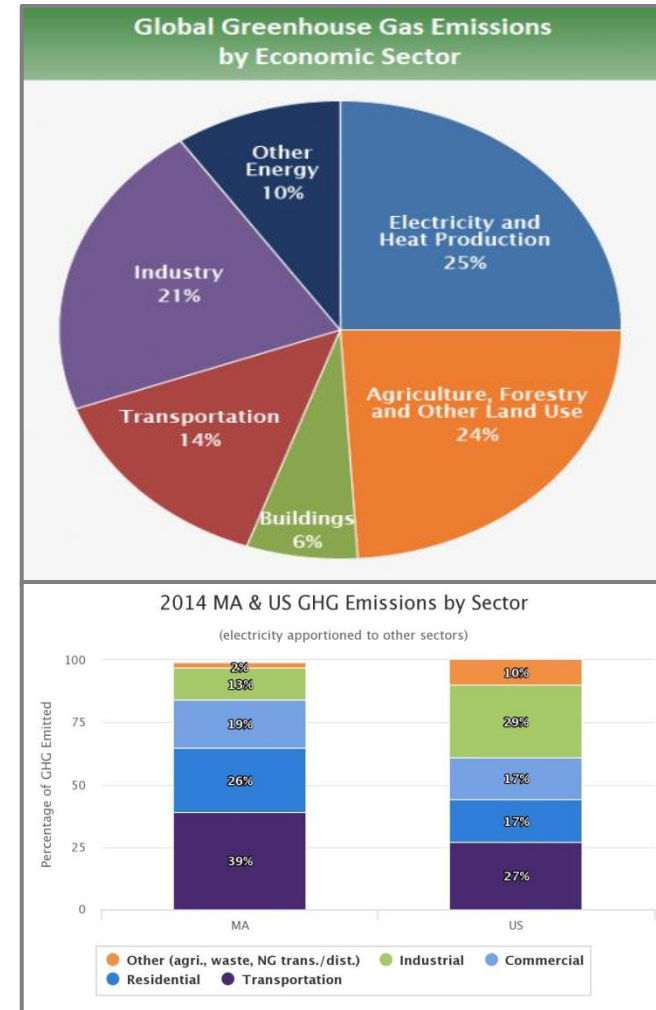
- **Decreasing Costs**
 - Li-ion battery prices decreased >50% from 2012-2015; another 50% decrease expected by 2019
 - Production volume key factor in battery pack cost
- **Longer Range**
 - Advancements in energy density of batteries
- **More Charging Stations**
 - EVSEs also surpassed 2 million worldwide in 2016
 - China is again the leader: fast chargers grew sevenfold in 2016
- **Financial Incentives & other Govt. Policies**



What is Driving this Shift?

- Transportation is a significant contributor to GHG emissions worldwide
- Paris Agreement sets objective to keep warming well below 2°C, preferably 1.5°C
 - All scenarios require energy-related GHG emissions to be net-zero by end of century

The rapid electrification of the transportation sector is a critical component of Paris Agreement



Government Support for Rapid Transition

- 2016: 14 countries had EV targets in place
 - If met, will support 13 million EVs on road by 2020 (a 650% increase)
- 2017: Leading countries set even more ambitious targets

2025

Norway: ban gas & diesel cars

Netherlands: ban Internal Combustion Engines (ICEs)

2030

EV30@30: EVI members to have 30% market share be EVs

Germany: ban ICEs

India: sell only EVs; 50% of LDV stock is electric

2040

France: end sale of gas & diesel cars

UK: end sale of gas & diesel cars

China: phase out sales of ICEs (not official)

2050

U.S.: 8 states pledge to ban vehicles fueled primarily by gas & diesel

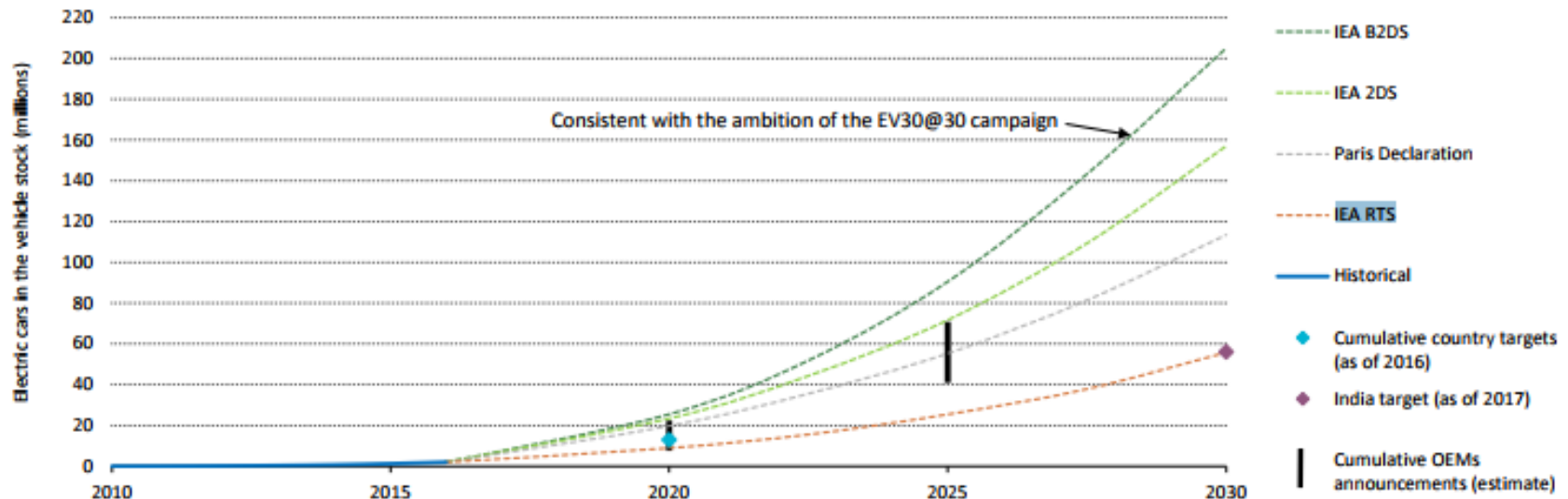
Norway to be world's first fully electric society

EV Market Forecasts

- EV sales will continue to grow
 - OEM & government targets predict
 - 9-20 million EVs by 2020
 - 40-70 million EVs by 2025
- After 2025, sale of ICEs will dwindle fast
 - Price tipping point expected around 2025
 - BEVs will cost less than ICEs by 2030
 - Charging stations to grow exponentially in China, U.S. and Europe over next 8 years
 - Zero-Emission Zones (ZEZs) will become more popular, making urban areas off-limits to ICEs

But is it Enough?

- To meet 2 degree warming scenario:
 - 140 million EVs needed by 2030, requiring:
 - 10 gigafactory-sized battery manufacturing facilities
 - 11 million publically available EVSEs
 - 600 million EVs needed by 2040 (30% of vehicles worldwide)



Massachusetts EV Related Efforts

Statewide Goals

- Global Warming Solutions Act
 - 25% GHG emission reduction by 2020
 - Significant focus on transportation sector
- Statewide EV Goal (all sectors): 300,000 by 2025

State Government

- Fuel Efficiency Standard for State Fleet
- DEP 3d Regulations for state government LDV

Existing and Upcoming Vehicle Technology

The future of E-Mobility



LBE Council meeting
November 14 2017

Stephen Russell
Massachusetts Clean Cities

Cars:

Fuel cell Zero Emission Vehicles from Toyota & Honda
14 Battery, 19 plug in models on market now in US

Trucks and Vans:

Zenith motors - 125 mile range Transit van
Lightning Hybrid - 100 mile EV transit van
XL Hybrid -

- Van, F250 and other hybrid upfits – 25% ↑mpg
- Plug in F 150 Pick-up -- 50% ↑ MPG

Buses:

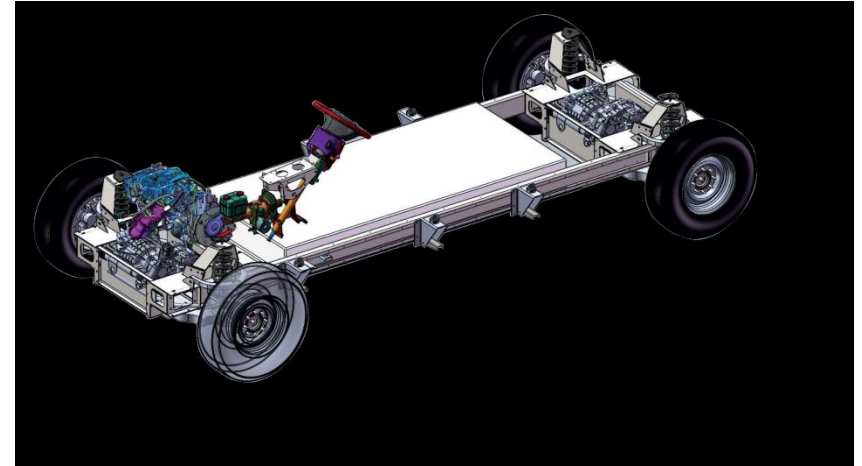
Proterra and BYD have 300 mile range Transit buses
Elion – EV school bus

And Autonomous vehicles

Electric Cars



Workhorse PU, Zenith EV van, Lightning EV van



BYD Bus ,Toyota Mirai, EV school bus



Autonomous vehicles



Contact Information & Important Links

Stephen Russell
Massachusetts Clean Cities Coordinator
Department of Energy Resources
617 626-7325
Stephen.russell@state.ma.us

Clean Cities Website: www.cleancities.energy.gov

Mass Clean Cities Website: www.mass.gov/energy/cleancities

Alternative Fuels & Advanced Vehicles Data Center: www.afdc.energy.gov

Clean Cities National Parks Initiative: <https://cleancities.energy.gov/national-parks>

The Ins and Outs of Charging Station Selection and Installation

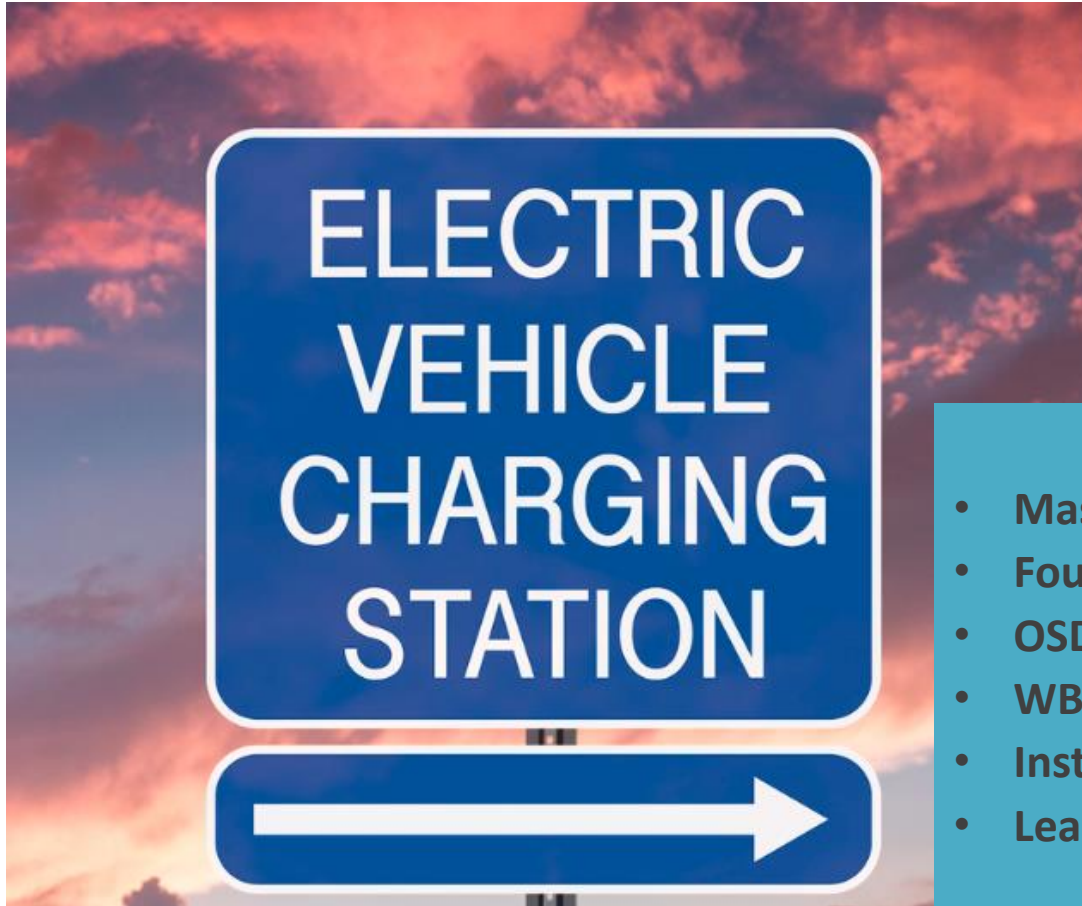
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VOLTREK

POWERING YOUR JOURNEY SM

A Little About Us



- Massachusetts Company
- Founded in 2010
- OSD Vendor Contract VEH 102
- WBE/DBE Certified
- Installed 600+ Charging Ports
- Leader in EVSE Project Management

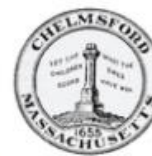
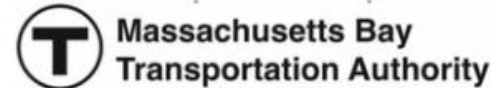
Some of Our Clients



MASSACHUSETTS
MEDICAL SOCIETY



Harvard Pilgrim
HealthCare



Town of
Lexington
Massachusetts



HARVARD
MEDICAL SCHOOL

EVSE (Electric Vehicle Supply Equipment) Installation



EV Charging
What?
Where?
How much?

What Equipment to Choose



Speed: Level 1, 2 & DC Fast Charging

Speed is is regulated by vehicle

Level 1

5 MPH of charging

- 120V AC / 15-20APMs
- Typical duration 12-24 hours

Level 2

10-25MPH of charging

- 240V AC / Typically 32AMPS/ 7kW
- Average 20+ miles range per hour charge*
- Typical duration to charge 4-8 hours

DC Fast Charging

90-180MPH of charging

- 208v or 480v / Amperage varies
- 50 kW- 150kW (300- 700kW next gen)
- Charges to 80% capacity
- Typical charge 35 minutes



Networked vs. Non-Networked Level 2

Networked Station

- Usage Reporting
- Allows granting access to other parties
- Continuous monitoring
- Increase up time
- Access Control
- Billing Capable
- Real time online location services
- Enables Circuit sharing features & dynamic load Management
- Driver notification for rotation
- V2G capable

- **Cost range \$3,500-\$7,200**
- **Ann. Network fees \$280/ port (avg.)**

Non Networked Station

- Simple usage
- Can not monitor status
- Can not control access
- Can not bill
- Can not notify drivers when open
- May support 3rd party network or access control products that will enable above functions

- **Cost range \$1,000-\$4,200**
- **No Ann. Fees**

Other Features & Considerations



- ☐ Cord management Systems
- ☐ Dual configuration (saves \$)
- ☐ Dual Connector Types (for DC)
- ☐ Durability of Materials

How Much it Will Cost



Depends on These Biggest Factors

- \$ Availability of power (existing vs. new)
- \$ Proximity of site to power source
- \$ Excavation
- \$ Mounting style
- \$ Pre-run conduit vs. new

Ways to Save

- Use internal electrical & excavation staff (if applicable)
- Plan for additional future stations at time of first install
- Avoid Excavation (wall mount)
- Apply for grants, Utility Programs and other available funding (E.A.)

Installation Cost: Level 1, 2 & DC Fast Charging

Varies greatly- commercial installation

Level 1

Typical Range \$1,500-\$15,000+

- 120V AC / 15-20APMs

Level 2

Typical Range \$1,500- \$15,000+

- 240V AC / Typically 32AMPS

DC Fast Charging

Typical Range \$15,000-\$50,000

- 208v or 480v / Typically 80-200+amps
- 50 kW- 150kW (300- 700kW next gen)

With Engineering, civil plans, traffic management, new service etc.

Increase Range \$50,000-\$150,000



Where & How to Install



Placement Matters

Accessibility, Visibility & Affordability

- Most L1 & 2 station are set between spaces
- Setting in center of 4 Spaces allows for better usage
- Valet Service can maximize usage

Site Assessment Checklist



All EVSE must be installed on a dedicated circuit

- ☐ Identify EVSE circuit requirements
- ☐ Identify all potential power sources
- ☐ Determine existing load capacity of panels and transformers
- ☐ Determine requirements to plan for future additional stations
- ☐ Identify potential mounting locations/ traffic flow / usage patterns
- ☐ Determine cellular signal availability (if equipment is on cell based network)
- ☐ Determine what protection is needed (bollards etc.)

When Sighting Consider

- ✓ Locating in non-premium spots (to reducing icing)
- ✓ Walk ways/ cords
- ✓ Distance/ Reachability of Handle
- ✓ Snow banks (outdoors)
- ✓ Space size (NOT COMPACT CARS)
- ✓ Expected car/charging duration
- ✓ Maximizing # cars w/ access
- ✓ Protection
- ✓ Future expansion
- ✓ Signage



Avoid Common Mistakes



Too Far from Curb

- Reduced accessibility all year due
- Snow bank buried in Winter

Cords Across Walk

- create tripping hazard

Typical Bollard Mount Layout



Teradyne Company, MA

Station face within 10-15" to front of curb

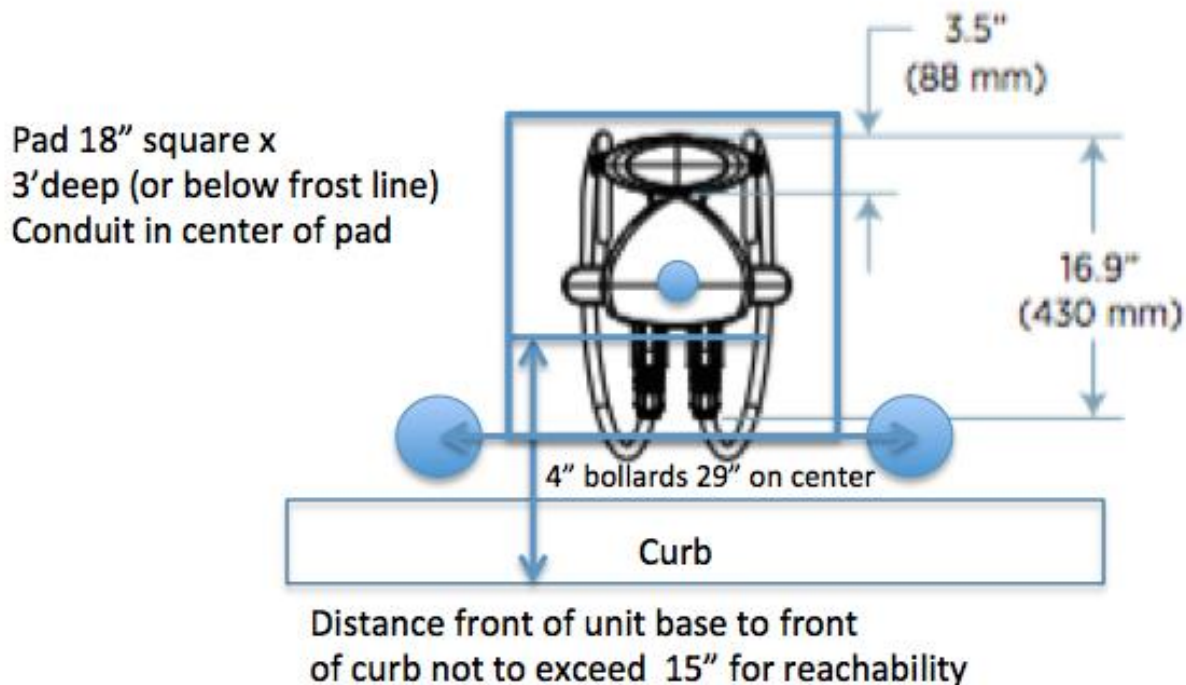
- Protective Bollards may be placed in front of or behind curb but should be snug to curb to avoid creating a walkway obstacle



Lexington, MA

Typical Bollard Mount Layout

CT4021 Bollard



Typical Wall Mount Layout

Wall mounted units

- Usually do not require protective measures
- Set between spaces



Accessibility

There are multiple levels of accessibility

- Picture shows van accessible space with 5' clearance in front of station
- 3' clearance more typical when setting for increased accessibility
- Distance required of bollards how they create obstruction to reach
- Most EVSE is designed to sit at ADA guideline height when on grade or on 6" curb.

Consult your compliance dept. for guidance.



ADA General Accessibility Guidelines

Reach must be within 10" for typical charger to comply

There are currently no federal guidelines specific to EVSE

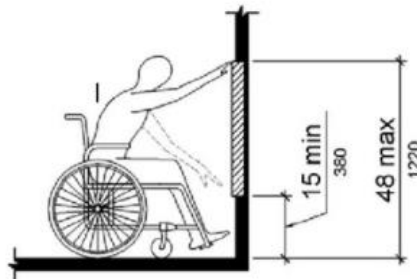
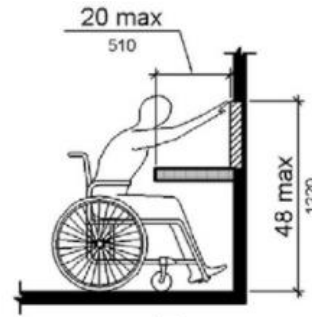
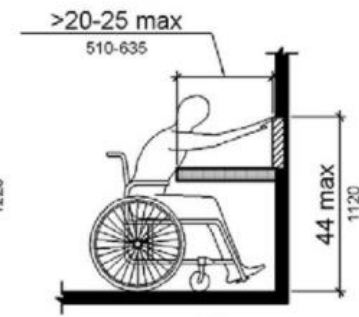


Figure 308.2.1
Unobstructed Forward Reach



(a)



(b)

Figure 308.2.2
Obstructed High Forward Reach

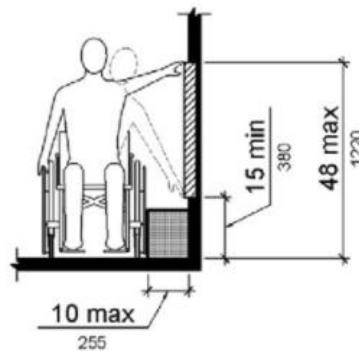
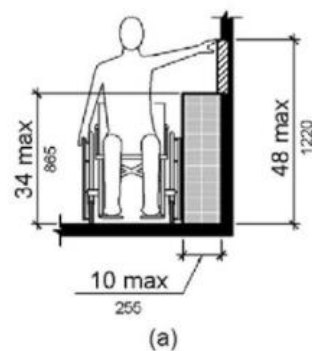
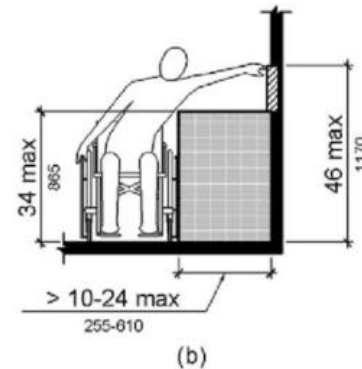


Figure 308.3.1
Unobstructed Side Reach



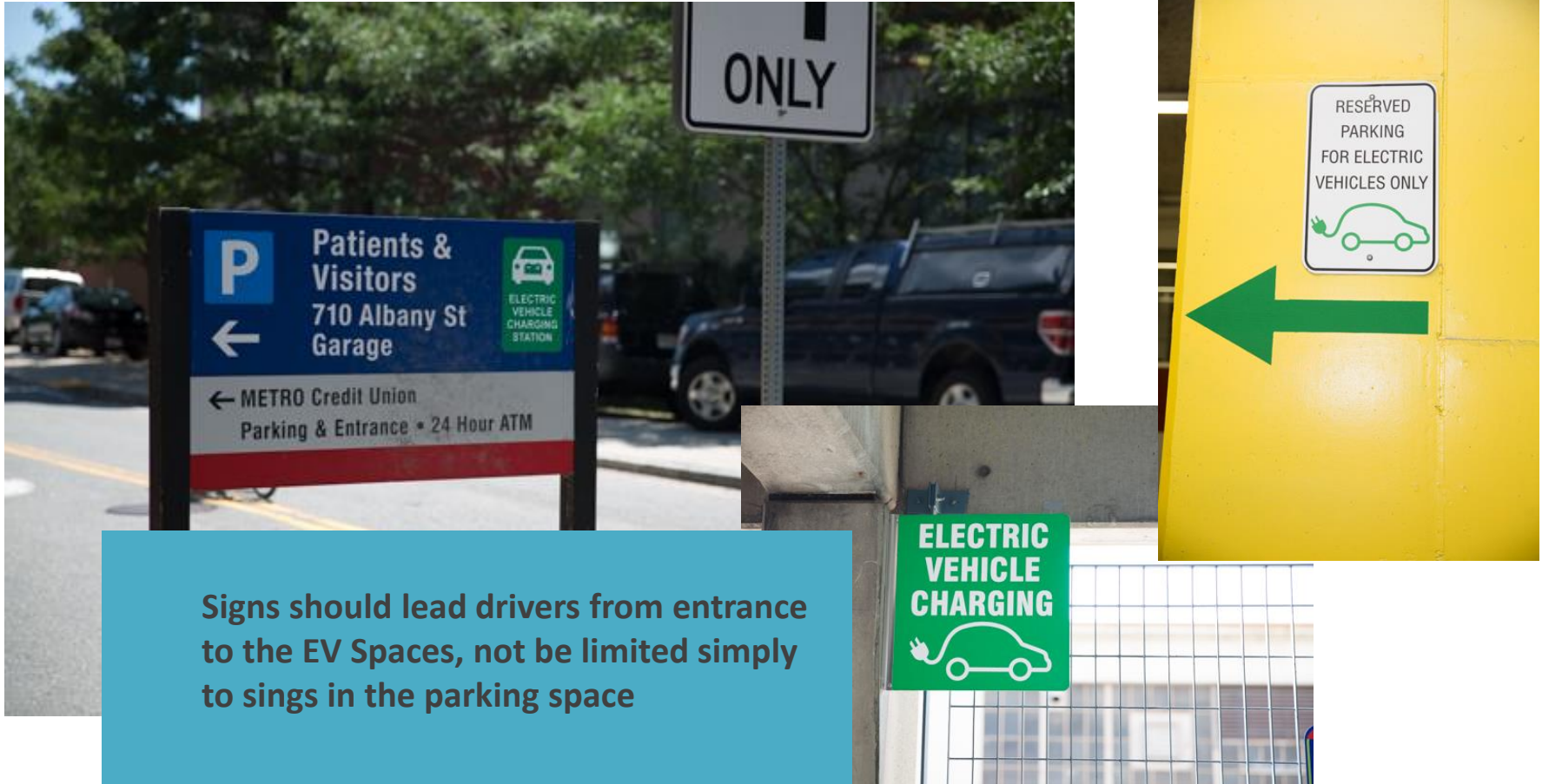
(a)



(b)

Figure 308.3.2
Obstructed High Side Reach

Don't Forget Signage



Signs should lead drivers from entrance to the EV Spaces, not be limited simply to signs in the parking space

The Road to Charging Summary



Phase 1- Planning, Planning, Planning

- EVSE (charger) selection
- Site assessment for power availability & site design
- Usage policy & management plan

Phase 2- Implementation

- Installation
- Programing
- Training

Phase 3- Maintenance & Management

- Monitoring (access, billing,
- Reporting
- Servicing

Contact Information



Accessing Advanced Vehicles and Vehicle Technologies through Statewide Contracts VEH98 and VEH102

Statewide Contracts Supporting Clean Vehicle Technologies

- **VEH98: Light Duty Vehicle Contract**
 - Over 500 vehicles from 12 dealers and 9 OEMs
 - Includes many fuel efficient options and hybrid, electric (PHEVs + BEVs), natural gas & diesel vehicles
 - Fuel-saving add-ons such as engine idle shut-off technology
- **VEH102: Advanced Vehicle Technologies Contract**
 - EV Charging Stations & Services
 - Idle Reduction Technologies
 - After-market Hybrid and Alternative Fuel Conversions

Fuel Efficient Vehicles on VEH98

Passenger Cars

- 3 BEVs, 5 PHEVs, 7 Hybrids
- More than half vehicles offered > 32 MPG

Trucks, Vans and SUVs

- 1 PHEV, 1 hybrid
- Fuel efficient options increase each model year
 - 31 models > 22 MPG, representing all categories (17 SUVs, 9 vans, 5 trucks)

Make/Model	Vehicle Type	MPG
Chevrolet Bolt (EV)	Passenger Car	119
Nissan Leaf (EV)	Passenger Car	112
Ford Focus (EV)	Passenger Car	107
Toyota Prius Prime (Plug-in)	Passenger Car	133 MPGe
Chevrolet Volt (Plug-in)	Passenger Car	106 MPGe
Ford Fusion Energi (Plug-in)	Passenger Car	97 MPGe
Hyundai Sonata (Plug-in)	Passenger Car	93 MPGe
Ford C-Max Energi (Plug-in)	Passenger Car	88 MPGe
Chrysler Pacifica (plug-in)	Mini-Van	84
Chevrolet Malibu Hybrid	Passenger Car	46
Ford Fusion Hybrid	Passenger Car	42
Hyundai Sonata Hybrid	Passenger Car	42
Ford C-Max Hybrid	Passenger Car	40
Toyota Camry Hybrid	Passenger Car	40
Toyota Rav4 Hybrid	SUV	32

Advanced Vehicle Technologies on VEH102

	<u>Category 1</u>	<u>Category 2</u>	<u>Category 3</u>
VENDOR	ELECTRIC VEHICLE SUPPLY EQUIPMENT	ANTI-IDLING TECHNOLOGY	HYBRID RETROFIT TECHNOLOGY
ClipperCreek, Inc.	√		
EVSE, LLC	√		
Graybar Electric Company, Inc.	√		
LiquidSky Technologies	√		
Verdek	√		√
Voltrek, LLC	√		
eNow, Inc.		√	
Magmotor Technologies, Inc.			√
National Van Builders, Inc.			√
XL Hybrids			√



EV Charging Stations



Auxiliary Power Unit



Propane Truck Conversion

EV Charging Stations on VEH102

	Location	Charging Station Levels	Software	Billing Services	Site Assessment	Installation	Servicing
Clipper Creek	CA	1,2					
EVSE LLC	CT	1,2	✓	✓	✓	✓	✓
Graybar Electric Company	MA	2	✓	✓	✓		
LiquidSky Technologies	MA	2			✓	✓	✓
Verdek	CT	1,2, DCFC	✓	✓	✓	✓	✓
Voltrek, LLC	MA	1,2,DCFC	✓	✓	✓	✓	✓

LBE EV Charging Station Guidance

Charging Station Guidance for MA State Campuses and Facilities

- Goal
 - Increase EV adoption by providing charging infrastructure at State facilities
 - Support GHG emission reduction targets
- Document Purpose
 - Identify challenges associated with EVSE at state facilities
 - Offer, information, options, and best practices for workplace charging programs



Document Outline



- Background
- Site Assessment and Configuration
 - Number of stations, station location
- Equipment and Installation
 - charging level, installation costs, other considerations
- Management
 - Operations and maintenance, maintenance agreements, other policies
- Target release by end of CY2017

Group Discussion

- *Does your agency/campus have specific Alternative Vehicle or Infrastructure goals?*
- *Do any of you plan to add EV charging stations in the next year?*
- *How can LBE support your alternative vehicle efforts?*